

Title Induction of oxidation in living cells by time-varying electromagnetic fields.

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Abstract

We are studying how biological systems can harness quantum effects of time varying electromagnetic (EM) waves as the time-setting basis for universal biochemical organization *via* the redox cycle. The effects of extremely weak EM field on the biochemical redox cycle can be monitored through real-time detection of oxidation-induced light emissions of reporter molecules in living cells. It has been shown that EM fields can also induce changes in fluid transport rates through capillaries (~300 um inner diameter) by generating annular proton gradients. This effect may be relevant to understanding cardiovascular dis-function in spaceflight, beyond the ionosphere. Importantly, we show that these EM effects can be attenuated using an active EM field cancellation device. Central for NASA's Human Research Program is the fact that the absence of ambient EM field in spaceflight can also have a detrimental influence, namely *via* increased oxidative damage, on DNA replication, which controls heredity.